

CPC**COOPERATIVE PATENT CLASSIFICATION****F03B**

MACHINES OR ENGINES FOR LIQUIDS (positive-displacement engines for liquid [F03C](#) ; machines for liquids and gases [F01](#) ; positive-displacement machines for liquids [F04](#) , rotary fluid gearing of the hydrokinetic type [F16H 41/00](#))

NOTE

Attention is drawn to the notes preceding Class [F01](#) , especially as regards the definition of "reaction type".

This subclass comprises:

- engines, other than of positive-displacement type, driven by liquids;
- machines, other than of positive-displacement type, for liquids.

Guide heading:

Non-positive-displacement machines or engines characterised by specified type, e.g. water turbines (adaptations of machines or engines for special use [F03B 13/00](#); controlling [F03B 15/00](#))

F03B 1/00

Engines of impulse type, i.e. turbines with jets of high-velocity liquid impinging on blades or like rotors, e.g. Pelton wheels
Parts or details peculiar thereto

F03B 1/02

- . Buckets
- Bucket-carrying rotors

F03B 1/04

- . Nozzles (in general [B05B](#))
- Nozzle-carrying members

F03B 3/00

Machines or engines of reaction type
Parts or details peculiar thereto

F03B 3/02

- . with radial flow at high-pressure side and axial flow at low-pressure side of rotors, e.g. Francis turbines { (rotors per se [F03B 3/12C](#)) }

F03B 3/04

- . with substantially axial flow throughout rotors, e.g. propeller turbines { (rotors per se [F03B 3/14D](#)) }

F03B 3/06

- . . with adjustable blades, e.g. Kaplan turbines { (rotors per se [F03B 3/14](#)) }

F03B 3/08

- . with pressure-velocity transformation exclusively in rotors

F03B 3/10

- . characterised by having means for functioning alternatively as pumps or turbines {starting [F03B 15/005](#) }

F03B 3/103

- . . {the same wheel acting as turbine wheel and as pump wheel }

F03B 3/106

- . . {the turbine wheel and the pumps wheel being mounted in adjacent positions on the same shaft in a single casing }

- F03B 3/12
 - . Blades
 - Blade-carrying rotors
- F03B 3/121
 - .. {Blades, their form or construction }
- F03B 3/123
 - ... {specially designed as adjustable blades, e.g. for Kaplan-type turbines }
- F03B 3/125
 - .. {Rotors for radial flow at high-pressure side and axial flow at low-pressure side, e.g. for Francis-type turbines }
- F03B 3/126
 - .. {Rotors for essentially axial flow, e.g. for propeller turbines (with adjustable blades [F03B 3/14](#)) }
- F03B 3/128
 - .. {Mounting, demounting }
- F03B 3/14
 - .. Rotors having adjustable blades {blade form or construction [F03B 3/123](#) }
- F03B 3/145
 - ... {Mechanisms for adjusting the blades (if the regulation aspect is preponderant, see [F03B 15/00](#) and subgroups) }

- F03B 3/16
 - . Stators
- F03B 3/18
 - .. Stator blades
 - Guide conduits or vanes, e.g. adjustable {Conduits in dams or the like [F03B 13/08](#); arrangement of valves [F03B 11/004](#) }
- F03B 3/183
 - ... {Adjustable vanes, e.g. wicket gates }
- F03B 3/186
 - ... {Spiral or volute casings }

- F03B 5/00**
Machines or engines characterised by non-bladed rotors, e.g. serrated, using friction

- F03B 7/00**
Water wheels {of swinging flap type [F03B 17/06](#) }
- F03B 7/003
 - . {with buckets receiving the liquid }
- F03B 7/006
 - . { of the endless-chain type }

- F03B 9/00**
Endless-chain machines or engines
- F03B 9/005
 - . {with buckets receiving the liquid }

- F03B 11/00**
Parts or details not provided for in, or of interest apart from, the preceding groups (controlling [F03B 15/00](#)) , {e.g. wear-protection couplings, between turbine and generator }
- F03B 11/002
 - . { Injecting air or other fluid ([F03D 11/0025](#), [F03B 11/04](#), [F03B 15/00](#) take precedence) }
- F03B 11/004
 - . {Valve arrangements ([F03B 3/10](#) takes precedence; adjustable wicket gates [F03B 3/183](#); valves in general [F16K](#)) }
- F03B 11/006
 - . {Sealing arrangements ([F03B 3/14](#), [F03B 3/183](#), [F03B 13/083](#) takes precedence; sealings in general [F16J](#)) }
- F03B 11/008
 - . {Measuring or testing arrangements (in general [G01](#)) }

- F03B 11/02 . Casings {Spiral or volute casings [F03B 3/186](#) }
- F03B 11/025 .. {Covers }
- F03B 11/04 . for diminishing cavitation or vibration, e.g. balancing
- F03B 11/06 . Bearing arrangements
- F03B 11/063 .. {Arrangements for balancing axial thrust }
- F03B 11/066 ... {in vertical axis machines }
- F03B 11/08 . for removing foreign matter, e.g. mud
- F03B 13/00** **Adaptations of machines or engines for special use**
Combinations of machines or engines with driving or driven apparatus (if the apparatus aspects are predominant, see the relevant subclasses for such apparatus, e.g. [H02K 7/18](#))
Power stations or aggregates (incorporating only machines or engines of positive-displacement type [F03C](#) ; hydraulic engineering aspects [E02B](#) ; {combinations with wind energy converters [F03D 9/008](#) })
- F03B 13/02 . Adaptations for drilling wells
- F03B 13/04 . Adaptations for use in dentistry {for driving tools or the like having relatively small outer diameter, e.g. pipe cleaning tools }
- F03B 13/06 . Stations or aggregates of water-storage type, {e.g. comprising a turbine and a pump } (turbines characterised by having means for functioning alternatively as pumps [F03B 3/10](#))
- F03B 13/08 . Machine or engine aggregates in dams or the like
Conduits therefor, {e.g. diffusors (bulb groups [F03B 13/105](#)) }
- F03B 13/083 .. {The generator rotor being mounted as turbine rotor rim }
- F03B 13/086 .. {Plants characterised by the use of siphons; their regulation (siphon weirs [E02B 7/18](#); siphons in general [F04F 10/00](#)) }
- F03B 13/10 . Submerged units incorporating electric generators or motors
- F03B 13/105 .. {Bulb groups }
- F03B 13/12 . characterised by using wave or tide energy
- F03B 13/14 .. using wave energy
- F03B 13/141 ... {with a static energy collector }
- F03B 13/142 {which creates an oscillating water column }
- F03B 13/144 {which lifts water above sea level }
- F03B 13/145 {for immediate use in an energy converter }
- F03B 13/147 {for later use }
- F03B 13/148 ... {using the static pressure increase due to the wave }
- F03B 13/16 ... using the relative movement between a wave-operated member, {i.e. a "wom" } and another member, {i.e. a reaction member or "rem" }
- F03B 13/18 where the other member, {i.e. rem } is fixed, at least at one point, with

		respect to the sea bed or shore
F03B 13/1805	.....	{and the wom is hinged to the rem }
F03B 13/181	.....	{for limited rotation }
F03B 13/1815	.....	{with an up-and-down movement }
F03B 13/182	.....	{with a to-and-fro movement }
F03B 13/1825	.....	{for 360° rotation }
F03B 13/183	.....	{of a turbine-like wom }
F03B 13/1835	.....	{of an endless-belt type wom }
F03B 13/184	.....	{of a water-wheel type wom }
F03B 13/1845	.....	{and the wom slides relative to the rem }
F03B 13/185	.....	{not vertically }
F03B 13/1855	.....	{where the connection between wom and conversion system takes tension and compression (F03B 13/187 , F03B 13/1875 take precedence) }
F03B 13/186	.....	{the connection being of the rack-and-pinion type }
F03B 13/1865	.....	{where the connection between wom and conversion system takes tension only (F03B 13/187 , F03B 13/1875 take precedence) }
F03B 13/187	.....	{and the wom directly actuates the piston of a pump }
F03B 13/1875	.....	{and the wom is the piston or the cylinder in a pump }
F03B 13/188	.....	{and the wom is flexible or deformable }
F03B 13/1885	.....	{and the wom is tied to the rem }
F03B 13/189	.....	{acting directly on the piston of a pump }
F03B 13/1895	.....	{where the tie is a tension/compression member }
F03B 13/20	....	wherein both members {i.e. wom and rem } are movable relative to the sea bed or shore
F03B 13/22	...	using the flow of water resulting from wave movements to drive a motor or turbine { (F03B 13/144 takes precedence) }
F03B 13/24	...	to produce a flow of air, e.g. to drive an air turbine { (F03B 13/142 takes precedence) }
F03B 13/26	..	using tide energy
F03B 13/262	...	{using the relative movement between a tide-operated member and another member }
F03B 13/264	...	{using the horizontal flow of water resulting from tide movement }
F03B 13/266	...	{to compress air }
F03B 13/268	...	{making use of a dam }
F03B 15/00		Controlling (controlling in general G05) { regulation of plants characterised by the use of siphons F03B 13/086 }
F03B 15/005	.	{Starting, also of pump-turbines }
F03B 15/02	.	by varying liquid flow
F03B 15/04	..	of turbines (rotors having adjustable blades F03B 3/06 , F03B 3/14 ; adjustable guide vanes F03B 3/18 ; specially adapted for turbines with jets of high-velocity liquid impinging on bladed or like rotors F03B 15/20)

- F03B 15/06 . . . Regulating, i.e. acting automatically
- F03B 15/08 by speed, e.g. by measuring electric frequency or liquid flow
- F03B 15/10 without retroactive action
- F03B 15/12 with retroactive action
- F03B 15/14 by or of water level
- F03B 15/16 by power output
- F03B 15/18 for safety purposes, e.g. preventing over-speed
- F03B 15/20 . . specially adapted for turbines with jets of high-velocity liquid impinging on bladed or like rotors ([nozzles F03B 1/04](#))
- F03B 15/22 . . . for safety purposes

F03B 17/00 Other machines or engines

- F03B 17/005 . { Installations wherein the liquid circulates in a closed loop ([F03B 13/06 takes precedence](#)) ; Alleged perpetua mobilia of this or similar kind (perpetua mobilia using hydrostatic thrust or buoyancy [F03B 17/04](#)) }
- F03B 17/02 . using hydrostatic thrust
- F03B 17/025 . . {and reciprocating motion }
- F03B 17/04 . . Alleged perpetua mobilia { (with closed loop circulation or similar [F03B 17/005](#)) }
- F03B 17/06 . using liquid flow {with predominantly kinetic energy conversion }, e.g. of swinging-flap type, {"run-of-river", "ultra-low head" ([F03B 13/264 takes precedence](#)) }
- F03B 17/061 . . {with rotation axis substantially in flow direction }
- F03B 17/062 . . {with rotation axis substantially at right angle to flow direction }
- F03B 17/063 . . . {the flow engaging parts having no movement relative to the rotor during its rotation }
- F03B 17/064 {and a rotor of the endless-chain type }
- F03B 17/065 . . . {the flow engaging parts having a cyclic movement relative to the rotor during its rotation }
- F03B 17/066 {and a rotor of the endless-chain type }
- F03B 17/067 {the cyclic relative movement being positively coupled to the movement of rotation }
- F03B 17/068 {and a rotor of the endless-chain type }